AB Review Classwork (*there are hints at the end of the document)

No Calculator

1)

$$\int_1^2 \frac{dx}{x^3} =$$

(A) $\frac{3}{8}$ (B) $-\frac{3}{8}$ (C) $\frac{15}{64}$ (D) $\frac{3}{4}$

*2)

$$\int (x^2-2)\sqrt{x}\,dx =$$

(A) $\frac{2}{5}x^2\sqrt{x}-\frac{2}{3}x\sqrt{x}+C$

(B) $\frac{2}{5}x^2\sqrt{x}-\frac{4}{3}x\sqrt{x}+C$

(C) $\frac{2}{7}x^3\sqrt{x}-\frac{4}{3}x\sqrt{x}+C$

(D) $\frac{2}{7}x^3\sqrt{x}-\frac{2}{3}x^2\sqrt{x}+C$

*3)

$$\lim_{x\to 0} \frac{e^x+e^{-x}-2}{1-\cos x} =$$

A) 0 (B) 1 (C) $\frac{3}{2}$ (D) 2

*4)

If $f(x) = \int_2^{2x} \frac{1}{\sqrt{t^3+1}}\,dt$, then $f'(1) =$

A) 0

B) $\frac{1}{3}$

C) $\frac{2}{3}$

D) $\sqrt{2}$

E) undefined

5)

If $\int_0^k \frac{\sec^2 x}{1+\tan x}\,dx = \ln 2$ then the value of k is

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{2}$

6)

$$\int 3^{x^2} x \, dx =$$

A) $\dfrac{3^{x^2+1}}{x^2+1} + C$

B) $\dfrac{3^{x^2}}{\ln 9} + C$

C) $3^{x^2} \ln 3 + C$

D) $3^{x^3/3} + C$

E) None of these

7)

$$\int \sin 3\theta \, d\theta =$$

A) $3\cos 3\theta + C$

B) $-3\cos 3\theta + C$

C) $-\cos 3\theta + C$

D) $\frac{1}{3}\cos 3\theta + C$

E) $-\frac{1}{3}\cos 3\theta + C$

*8)

8. $\displaystyle\int_{-2}^{3} |x+1| \, dx =$

A) $\frac{5}{2}$ B) $\frac{17}{2}$ C) $\frac{9}{2}$ D) $\frac{11}{2}$ E) $\frac{13}{2}$

9)

$$\int_{\pi/4}^{\pi/3} \frac{\sec^2 x}{\tan x} \, dx =$$

(A) $\ln\sqrt{3}$ (B) $-\ln\sqrt{3}$ (C) $\ln\sqrt{2}$ (D) $\sqrt{3} - 1$

10. $\displaystyle\int_{\pi/4}^{\pi/2} \sin^3\theta \cos\theta \, d\theta =$

A) $\frac{3}{16}$ B) $\frac{1}{8}$ C) $-\frac{1}{8}$ D) $-\frac{3}{16}$ E) $\frac{3}{4}$

*11)

Let f be the function defined by $f(x) = \begin{cases} x+1 & \text{for } x < 0 \\ 1 + \sin \pi x & \text{for } x \geq 0. \end{cases}$ Then $\int_{-1}^{1} f(x)\, dx =$

(A) $\frac{3}{2} - \frac{2}{\pi}$

(B) $\frac{1}{2} - \frac{2}{\pi}$

(C) $\frac{3}{2} + \frac{2}{\pi}$

(D) $\frac{1}{2} + \frac{2}{\pi}$

12)

If the substitution $u = 1 + \sqrt{x}$ is made, $\int \frac{(1+\sqrt{x})^{3/2}}{\sqrt{x}}\, dx =$

(A) $\frac{1}{2}\int u^{3/2}\, du$ (B) $2\int u^{3/2}\, du$ (C) $\frac{1}{2}\int \sqrt{u}\, du$ (D) $2\int \sqrt{u}\, du$

13)

$\int_{0}^{4} \frac{2x}{x^2+9}\, dx =$

(A) 25

(B) 16

(C) $\ln \frac{25}{9}$

(D) $\ln 4$

*14)

If the function G is defined for all real numbers by $G(x) = \int_{0}^{2x} \cos(t^2)\, dt$, then $G'(\sqrt{\pi}) =$

(A) 2 (B) 1 (C) -1 (D) -2

15)

If the substitution $u = \ln x$ is made, $\int_e^{e^2} \frac{1-(\ln x)^2}{x}\, dx =$

(A) $\int_e^{e^2} (\frac{1}{u} - u^2)\, du$

(B) $\int_e^{e^2} (\frac{1}{u} - u)\, du$

(C) $\int_1^2 (1 - u^2)\, du$

(D) $\int_1^2 (1 - u)\, du$

*16)

The acceleration of a particle at time t moving along the x-axis is given by: $a = 4e^{2t}$. At the instant when $t = 0$, the particle is at the point $x = 2$ moving with velocity $v = -2$. The position of the particle at $t = \frac{1}{2}$ is

(A) $e - 3$ (B) $e - 2$ (C) $e - 1$ (D) $e+1$

17)

$$\int_0^5 \frac{dx}{\sqrt{1+3x}} =$$

(A) 4 (B) $\frac{8}{3}$ (C) 2 (D) $\frac{16}{9}$

*18)

The average value of $\sec^2 x$ over the interval $0 \le x \le \frac{\pi}{4}$ is

(A) $\frac{\pi}{4}$ (B) $\frac{4}{\pi}$ (C) $\frac{\pi}{8}$ (D) 1

19)

Which of the following definite integrals has the same value as $\int_1^3 \sqrt{20-4x}\, dx$?

(A) $-\frac{1}{4}\int_1^3 \sqrt{u}\, du$ (B) $\frac{1}{4}\int_8^{16} \sqrt{u}\, du$ (C) $4\int_8^{16} \sqrt{u}\, du$ (D) $\int_8^{16} \sqrt{u}\, du$

Hints:

2. (not u-sub; distribute then integrate)
3. LHop (twice)
4. 2nd FTC
8. (se geometry, not calculus
11. set up two integrals
14. 2nd FTC
15.
16. find the particular solution of the differential equation then evaluate
18. 1/(b – a): average value

Answers

1 A
2 C
3 D
4 C
5 B
6 B
7 E
8 B
9 A
10 A
11 C
12 B
13 C
14 A
15 C
16 C
17 C
18 B
19 B